

CLAIMS:

What is claimed:

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1. An optical disk comprising;
a recording layer having servo tracks; and
a clock reference structure formed along the servo tracks, the clock reference structure permitting data to be written to the recording layer in data fields of indeterminate length.
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2. The optical disk as recited in claim 1, wherein the clock reference structure comprises a reference spatial frequency which is greater than a predetermined spatial frequency.
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3. The optical disk as recited in claim 2, wherein the predetermined spatial frequency is the maximum spatial frequency detectable by a standard DVD-ROM reader.
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4. The optical disk as recited in claim 2, wherein the clock reference structure comprises edges of grooves of the servo tracks which oscillate in-phase at an oscillation spatial frequency, the oscillation spatial frequency corresponding to the reference spatial frequency.
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5. The optical disk as recited in claim 2, wherein the clock reference structure comprises edges of grooves of the servo tracks which oscillate substantially 180 degrees out-of-phase at an oscillation spatial frequency, the oscillation spatial frequency corresponding to the reference spatial frequency.
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6. The optical disk as recited in claim 2, wherein the clock reference structure comprises pits formed along the servo tracks, the reciprocal of a distance between centers of adjacent pits corresponding to the reference spatial frequency.

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1 7. The optical disk as recited in claim 1, wherein a first optical transducer coupled to the
2 clock reference structure generates a clock reference signal comprising a clock reference
3 signal frequency.

1 8. The optical disk as recited in claim 7, wherein the first optical transducer coupled to
2 data marks on the recording layer generates a data signal having a frequency spectrum in
3 which all fundamental frequency components of the frequency spectrum are less than the
4 clock reference signal frequency.

1 9. The optical disk as recited in claim 8, wherein a standard DVD-ROM reader can read
2 the data marks but cannot detect the clock reference structure.

1 10. An optical disk recorder comprising:
2 an optical disk rotatably mounted on the recorder, the optical disk having a
3 recording layer containing servo tracks;
4 a first optical transducer optically coupled to the recording layer of the optical
5 disk, the first optical transducer following a servo track as the optical disk rotates;
6 a clock reference structure formed along the servo tracks providing data fields of
7 indeterminate length, the clock reference structure causing the first optical transducer to
8 produce a clock reference signal as the optical disk rotates;
9 means for recording data marks on the recording layer of the optical disk, wherein
10 the data marks are recorded to include fundamental spatial frequencies less than a
11 predetermined spatial frequency; and
12 a write clock which determines the placement of data marks on the recording layer
13 of the optical disk, the write clock being phase locked to the clock reference signal.

1 11. The optical disk recorder as recited in claim 10, wherein the predetermined spatial
2 frequency is the greatest spatial frequency detectable by a standard DVD-ROM reader .

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1 12. The optical disk recorder as recited in claim 10, wherein the servo tracks include
2 grooves and the clock reference structure comprises edges of the grooves which oscillate
3 in-phase.

1 13. The optical disk recorder as recited in claim 12, wherein data marks cause the first
2 optical transducer to produce an unwanted data signal as the optical disk rotates, and the
3 clock reference signal is separated from the unwanted data signal by detecting the clock
4 reference signal using radial push-pull detection.

1 14. The optical disk recorder recited in claim 10, wherein the servo tracks include
2 grooves and the clock reference structure comprises edges on the grooves which oscillate
3 substantially 180 degrees out-of-phase.

1 15. The optical disk recorder recited in claim 14, wherein data marks cause the first
2 optical transducer to produce an unwanted data signal as the optical disk rotates, and the
3 clock reference signal is separated from the unwanted data signal by detecting the clock
4 reference signal using split detection.

1 16. The optical disk recorder recited in claim 10, wherein the clock reference structure
2 comprises pits formed along the servo tracks.

1 17. The optical disk recorder as recited in claim 10, wherein the data marks are
2 positioned along the servo tracks according to a DVD-ROM standard.

1 18. The optical disk recorder as recited in claim 10, wherein the data marks are
2 arbitrarily coded.

1 19. The optical disk recorder as recited in claim 10, further comprising a second optical
2 transducer which is optically coupled to the data marks on the recording layer, the second

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3 optical transducer following a servo track as the optical disk rotates, the data marks
4 causing the second optical transducer to produce a data signal as the optical disk rotates.

1 20. The optical disk recorder as recited in claim 19, wherein the first optical transducer
2 comprises a first laser and a first objective lens and the second transducer comprises a
3 second laser and a second objective lens.

1 21. The optical disk recorder as recited in claim 20, wherein a combination objective lens
2 is both the first objective lens and the second objective lens.

1 22. The optical disk recorder as recited in claim 20, wherein a numerical aperture of the
2 combination objective lens is adjustably controlled to be lower when reading data than
3 when recording data.

1 23. The optical disk recorder as recited in claim 20, wherein a wavelength of the second
2 laser is greater than a wavelength of the first laser.

1 24. An optical disk recorder for receiving an optical disk which is rotatably mountable on
2 the recorder, the optical disk comprising a recording layer having servo tracks and a clock
3 reference structure having a spatial frequency which is greater than a predetermined
4 spatial frequency, the clock reference structure being formed along the servo tracks and
5 providing data fields of indeterminate length, the optical disk recorder comprising:

6 a first optical transducer which can optically couple to a recording layer of the
7 optical disk, the first optical transducer following the servo tracks as the optical disk
8 rotates, the clock reference structure causing the first optical transducer to produce a
9 clock reference signal as the optical disk rotates;

10 means for writing data marks on the recording layer of the optical disk; and

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12 a write clock which determines the physical placement of data marks written on

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13 the recording layer of the optical disk, the write clock being phase locked to the clock
14 reference signal.

1 25. The optical disk recorder as recited in claim 24, wherein the predetermined spatial
2 frequency is the maximum spatial frequency detectable by a standard DVD-ROM reader.

1 26. The optical disk recorder as recited in claim 24, wherein the first optical transducer
2 can detect higher spatial frequencies than an optical transducer of a standard DVD-ROM
3 optical disk reader.

1 27. The optical disk recorder as recited in claim 24, further comprising a second optical
2 transducer which can optically couple to the data marks on the recording layer, the second
3 optical transducer following a servo track as the optical disk rotates, the data marks
4 causing the second optical transducer to produce a data signal as the optical disk rotates.

1 28. The optical disk recorder as recited in claim 24, wherein the first optical transducer
2 comprises a first laser and a first objective lens and the second transducer comprises a
3 second laser and a second objective lens.

1 29. The optical disk recorder as recited in claim 28, wherein a combination objective lens
2 is both the first objective lens and the second objective lens.

1 30. The optical disk recorder as recited in claim 29, wherein a numerical aperture of the
2 combination objective lens is adjustably controlled to be lower when reading data than
3 when recording data.

1 31. The optical disk recorder as recited in claim 29, wherein a wavelength of the second
2 laser is greater than a wavelength of the first laser.